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PRELIMINARY REVISION OF THE EVIDENCE RELATING TO AURIFEROUS GRAVEL MAN IN CALIFORNIA

By WILLIAM H. HOLMES

FIRST PAPER

INTRODUCTORY

During recent years much has been said and written regarding the antiquity of man in America, and as opportunity has presented I have engaged in the discussion of the subject, endeavoring to determine the exact value of the evidence brought forward by the various observers. By far the strongest body of data tending to establish the existence of a man of great antiquity is that emanating from the gold belt of California, and first brought together by Prof. James D. Whitney and published in his notable work on the Auriferous gravels.[1] There is considerable literature embodying original observations outside of this volume, the most important contribution being a paper by Dr George F. Becker, published in the *Bulletin* of the Geological Society of America for 1891.

For a long time I have entertained the idea of visiting the Pacific slope for the purpose of becoming personally acquainted with the region furnishing the evidence, and with the people, so far as the hand of time has spared them, familiar with the golden era of California. I hoped at least to see enough to enable me to make up my own mind as to the value of the evidence, and it seemed within the range of possibility that something decisive in the way of new evidence, or of side lights on the old, might develop—something that would open the way to a final settlement of the great questions at issue.

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[1] J. D. Whitney, *The Auriferous Gravels of the Sierra Nevada of California*, Cambridge, 1879, vol. VI, No. 1 (1st part).

In September, 1898, I received instructions from the Secretary of the Smithsonian Institution to visit California for the purpose of making collections and of prosecuting anthropological investigations along such lines as might promise to be of value to the National Museum. It was arranged that the work should be conducted under the auspices of the Director of the Bureau of American Ethnology. A short time before setting out I learned that Prof. W J McGee was contemplating a trip to the southwest a little later in the season, and I succeeded in inducing him to join me for a short time in the Auriferous gravel region; I thus had the advantage of conjoint work with him in a section of superlative interest geologically, archeologically, and scenically, and one that has been made classic in science by Whitney and in song by Bret Harte.

HISTORY OF DISCOVERIES

The auriferous, or gold-bearing, gravels, with which we are especially concerned, are scattered over a vast area in central California, extending from the high sierra on the east down the far-reaching ridges and canyons to the lowlands of the coastal belt, and from the Yuba on the north to the Merced on the south, an area equal in extent, perhaps, to that of the state of Connecticut.

The great gold discoveries began with the influx of miners in 1849, and during the two or three succeeding decades the gravel deposits were dug over to an extent without parallel in the history of mining operations. They were first attacked by pick and pan, then sluicing was introduced, and later hydraulic operations were conducted on a grand scale. Tunnel mining was also extensively carried on, and the mountains were pierced by countless shafts, sometimes so close together and so profound that it seemed almost that the mountains might collapse. This work had not continued long when reports began to be circulated, gradually reaching the ears of the outer world, that relics of man were found in these gravels, and controversies arose in which the religious press took a lively part, combating the idea that traces of man could be found in formations that antedated the days of Adam, as these gravels evidently did. Mr C. D. Voy of Oakland, Dr Perez Snell of Sonora, and others collected various relics reported to have come from the gravels, and secured some data relating to their origin; but the matter was never brought to a focus until Professor Whitney became interested in the discoveries and in the early sixties began with his assistants to visit the district and to collect and collate the scattered but remarkable observations.

WHITNEY'S RESEARCHES AND CONCLUSIONS

Professor Whitney found that the gold-bearing gravel deposits were, in the main, very old; that their formation began at least in middle Tertiary time and continued down to the end of the Pliocene period, and in fact in varying degree down to the present time. Examining the evidence with the utmost care, he found it impossible to avoid the conclusion that many of the relics of man and his arts came from those portions of the gravels that could with reasonable certainty be assigned to the Pliocene; that these finds were associated with the remains of extinct species of animals and plants; that they represented a race of ordinary physical characters, though having a culture of the lowest range compatible with the human status. He pointed out that a prominent feature of the evidence was its coherency; coming from a multitude of independent sources and from widely distributed localities it all pointed in one direction. There was no suggestion of the manufacture of evidence and no apparent motive for deception. The observations were all those of miners, but a "long chain of circumstantial evidence is frequently more convincing than a single statement of an [expert] eye witness."[1] Since

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[1] *Auriferous Gravels*, p. 260.

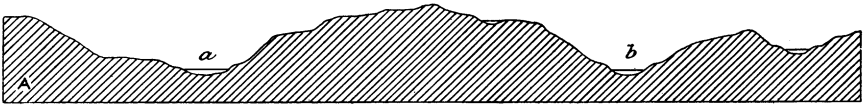
Whitney's time the evidence has been strengthened by Becker, and especially by his statement that Mr Clarence King, Director of the Survey of the Fortieth Parallel, found a pestle in the tufaceous deposits under the lava cap of Tuolumne table mountain and removed it from the matrix with his own hands.

It is impossible not to be deeply impressed by the amount and consistent nature of the evidence presented ; yet such is the magnitude of the proposition to be sustained that even this testimony seems inadequate, and we seek by reëxamination and renewed research to determine its exact strength and true significance.

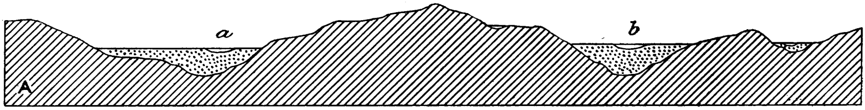
AGE OF THE AURIFEROUS GRAVELS

The substantial correctness of the geologic determinations of Whitney has recently been made fully apparent by the able geologists of the U. S. Geological Survey. It was expected by many students of the subject that the relic-bearing gravels would in time prove to be younger than Whitney believed; that they would be found to correspond in age with the Glacial period—possibly with the closing episodes of that period as determined in the eastern states ; and others were confident that they would prove to be even post-Glacial; but instead of this, Becker, Lindgren, Turner, and Diller have extended the gravel-forming epoch to cover the Miocene and probably the greater part of the Eocene, thus making comparisons with the close of the Glacial period hardly more reasonable than the attempt to include the whole group of phenomena within the period of biblical record. To say that they were ten times or a hundred times older than the Glacial period, as represented by the greatest extension of the ice in Ohio and Delaware valleys, would probably not be doing justice to a lapse of time that can be expressed only in several geologic periods.

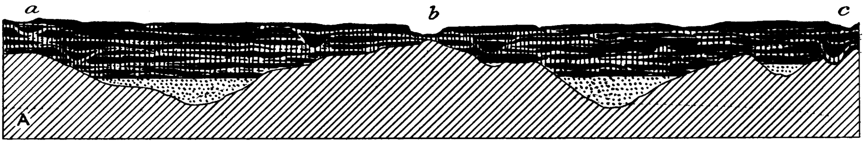
As many readers may not be familiar with the geologic relations of the Auriferous gravels, and hence find themselves unable



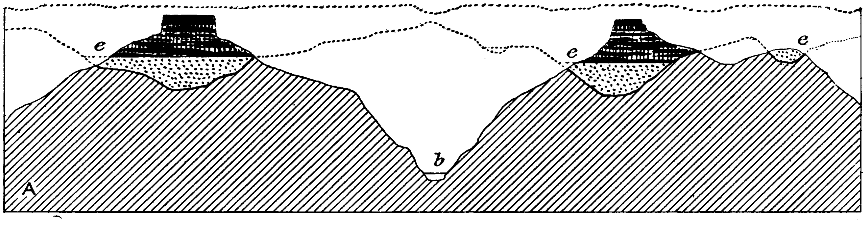
1—Section showing conditions in early Tertiary time. *A*, Auriferous slates; *a*, *b*, stream beds.



2—Conditions at close of great gravel-forming period and before volcanic activity began. *A*, Auriferous slates; *a*, *b*, river beds clogged with auriferous gravels.



3—Conditions at close of volcanic period; valleys filled up and mountains buried with eruptive formations. *A*, Auriferous slates; *a*, *b*, *c*, river channels.



4—Conditions today. Rivers in channels 2000 feet deep. Remnants of volcanic deposits and old river gravels capping mountain summits, *e*, *e*. Old profiles shown by dotted lines.

TRANSVERSE SECTIONS OF RIVER CHANNELS, AURIFEROUS GRAVEL REGION, AT FOUR WIDELY SEPARATED PERIODS

to form definite notions of the great lapse of time and the vast transformations of nature with which we have to deal, it may be well to present briefly the main features of the later geologic history of the region. The accompanying sections, with appended data, will serve to tell the story so fully that a few words only will be necessary to make it fully understood. In early Tertiary times the prototypes of the modern rivers ran out from the sierra down through the highland to the sea pretty much as they do today. The valleys were not so deep as now, as indicated in 1, plate V, but they had strong currents and rapidly scored down the gold-bearing formations which they traversed, filling the channels with coarse, waterworn debris to the depth of hundreds of feet and depositing the freed gold along their beds. This phase of progress is indicated in 2, plate V. It is from these gravels that some of the finds of human relics are reported, and it is therefore affirmed that along the banks of these ancient rivers the first human beings of which we have a trace lived and pursued their varied avocations.

But there came over this region a momentous change. A period of great volcanic activity set in, and streams of lava and rivers of mud descended from the sierra, filling up the valleys; new channels were eroded to be filled in their turn, one system of drainage succeeding another for a prolonged period, at the close of which the deepest valleys were filled to the brim, as shown in 3, plate V; and when the flows of basalt—the final products of vulcanism—ceased, the waters of the high sierra began the work of laying out the drainage system that has come down to the present time.

Since that remote day the region has been elevated to greater heights; the Merced, the Stanislaus, the Tuolumne, the American, the Yuba, and other streams have cut their channels by the slow processes of erosion down to profound depths and now run their courses in valleys two thousand feet deep and many miles in width—gorges so profound, precipitous, and vast that it is a day's journey to cross them even where the hand of the enterprising gold hunter has ventured to blaze the tedious way. The striking character of the present profile is shown in 4, plate V, by reference to which it may be seen that the cutting of the present valleys to such great depths has left the old stream-beds with their deposits of gravel, their treasures of gold, and (it is alleged) their relics of humanity high up toward the mountain summits (*e*). Here the miners seek and find the gravel outcrops and follow them far into and even through the ridges, the meanderings being so clearly defined that the courses of many of the Tertiary streams have been traced and laid down on the maps and the old river systems practically restored.

Those who get little idea of the lapse of time not expressed in years must fail to comprehend what vast ages are suggested to the geologist by the terms Eocene, Miocene, Pliocene, Pleistocene, and Recent, but the magnitude of the events involved—the entire obliteration of the old topography and the carving out of a new California, including such gorges as the Yosemite and the still more sublime Hetch-Hetchy—will readily be appreciated, and must make a deep impression on every mind and lead to hesitation in accepting the propositions that man matured before these events were initiated and that he has witnessed and survived their consummation.

CATEGORIES OF GRAVEL FINDS

Having reached satisfactory and apparently final conclusions respecting the age of the Auriferous gravels themselves, it is in order to examine the various groups of associated phenomena with which archeologists must concern themselves. There are four categories of data to be considered:

A. The animal remains (lower orders),
B. The plant remains,
C. The remains of man,
D. The remains of human handiwork.

A. The animal remains found in the gravels in fossil state represent a large number of species, chiefly mammals, identified by Dr Joseph Leidy. Whitney enumerates the following forms: Mastodon, elephant, rhinoceros, horse, camel, tapir, ox, llama, deer, wolf, and dog. These are all of extinct species, and although some may have existed down to post-Pliocene time, as indicated by Dr Becker, they fall as a group naturally within the Neocene age.

B. The fossil plants of the gravels secured in Whitney's time were studied by Dr Leo Lesquereux, and by this eminent authority were called Pliocene, although he found many forms that could with equal justice be assigned to the Miocene. Extensive collections obtained in more recent years have been identified by Ward and Knowlton, and it is agreed that on the whole they represent early rather than late Neocene forms, that they are clearly of middle Tertiary age. According to Professor Knowlton there is not one species which can undoubtedly be identified with living forms.[1]

C. Human remains reported from the gravels are not plentiful, and all that appear to have been preserved are an imperfect human cranium known as the *Calaveras skull* and a few unimportant fragments of another skull. Fragments of skulls and various bones of the body have been reported from the old gravels in a number of localities. These remains, and especially the Calaveras skull, indicate a man not differing materially from the California Indian of today, although said by Whitney to present some characteristics of the Eskimo.

D. The remains of human handiwork to be considered are, on the other hand, quite numerous. Many hundreds of specimens have been reported from the gravels and are believed, in a general way, to belong to the Neocene deposits. According to the finders, many of them were intimately associated with the remains of fossil animals and plants, and some appear to be from gravels that antedate the volcanic era.

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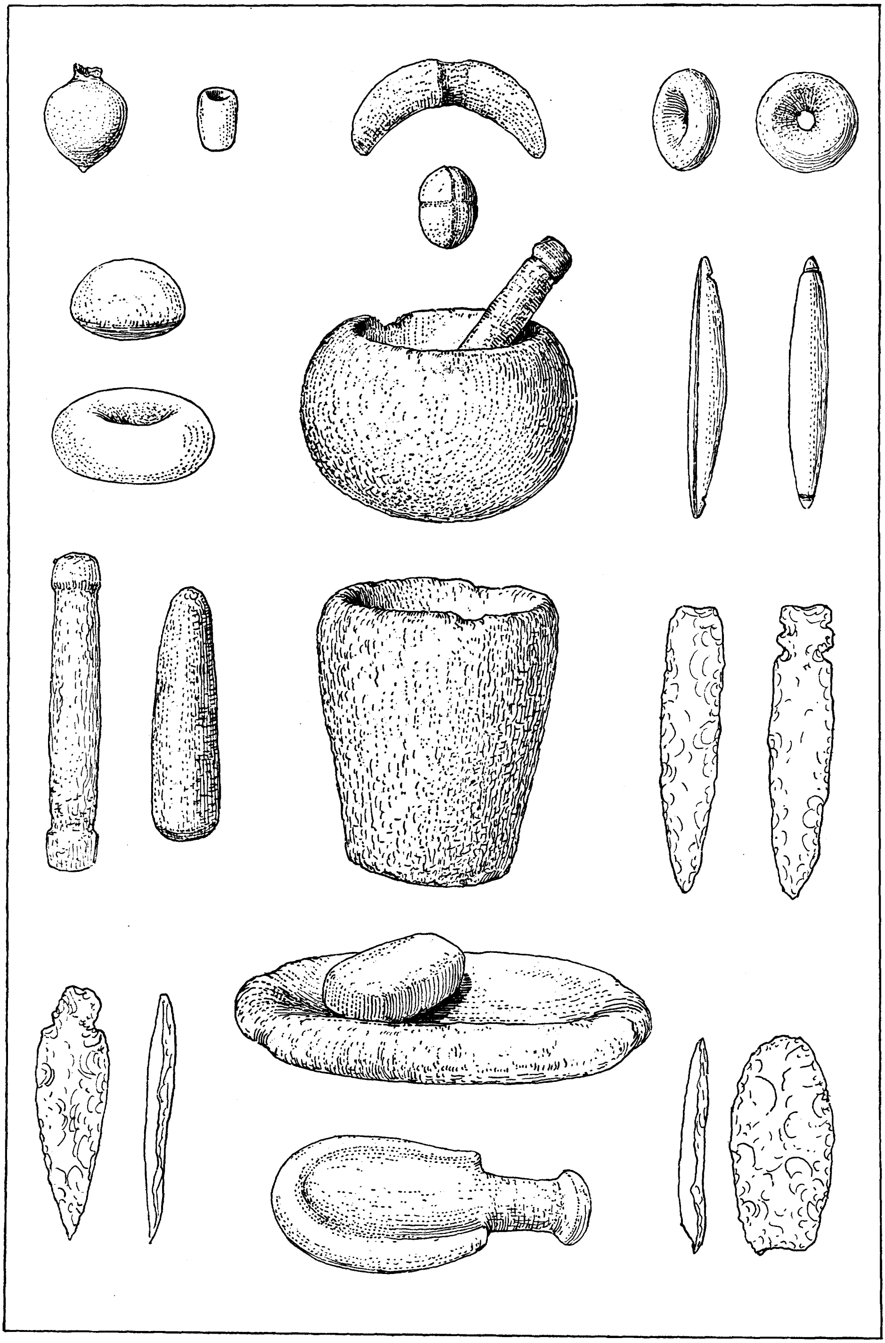
[1] Lindgren and Knowlton, *Age of the Auriferous Gravels* (*Journal of Geology*, vol. IV, No. 8, p. 905).

INCONGRUITIES IN THE EVIDENCE

In comparing these four groups of remains we observe that the fossil animals belong without exception to extinct species, that the plants are likewise extinct, and that all of both groups take their place naturally within the limits of the Neocene. When, however, we examine the human remains, we are met by the striking fact that they do not represent an extinct form, or even a well-marked variety of *Homo sapiens*, but a people structurally identical with ourselves; and it therefore takes a great stretch of the imagination to conceive that this man could have formed part of a fauna every other mammalian member of which has succumbed during the uncounted ages of succeeding geologic periods.

On examining the art remains it is found that they also seem out of place in Tertiary times, that they present a decidedly modern aspect. Of the fifteen or twenty varieties reported from the gravels by Whitney and others, all are of recent types—are identical with the stone implements used by the native tribes of California today or in the recent past. If these forms are really of Tertiary origin, we have here one of the greatest marvels yet encountered by science; and perhaps if Professor Whitney had fully appreciated the story of human evolution as it is understood today, he would have hesitated to announce the conclusions formulated, notwithstanding the imposing array of testimony with which he was confronted. To suppose that man could have remained unchanged physically; to suppose that he could have remained unchanged mentally, socially, industrially, and esthetically for a million years, roughly speaking, (and all of this is implied by the evidence furnished,) is to suppose a miracle.

Professor Whitney believed the implements found were just



IMPLEMENTS AND UTENSILS SAID TO HAVE BEEN DERIVED FROM THE AURIFEROUS GRAVELS

The figures included in the plate are copied from hasty sketches and do not assume to be exact. They serve, however, to indicate the general character of the finds. It is expected that photographic reproductions of the objects will be given in a final paper.

such as might be expected of a Tertiary man, and observed: "It has been always the same kind of implements which have been exhibited to us, namely: the coarsest and least finished which one would suppose could be made and still be implements."[1] But on examination we find that they are really of advanced types, and comprise the following varieties: Mortars (several forms), pestles (numerous forms), platters (dishes, metates), mullers (rubbing stones), hammerstones, handled ladles ("scoops"), plummet stones, rings of stone ("doughnuts"), pitted disks, shuttle-shape stones, grooved pebbles (hammerheads, sinkers), crescent stones, spearheads, arrowheads, knives, and broad blades, to which may be added stone beads and wampum.

The series of sketches presented in plate VI will convey a definite idea of the character of some of these objects and make apparent their practical identity with the familiar relics of our California tribes. The assertion that man shaped and used this group of artifacts in Tertiary times and continued to use them without change, without improvement or retrogression, down through the ages, through complete transformations of land and sea, and the extinction of all known living things, should be supported by proof more conclusive than anything yet adduced.

To suppose again that the ancient people disappeared as a result of nature's mutations, leaving their bones and handiwork in the stream beds of the Neocene period, and that another people, springing up or appearing on the same spot in recent years, have duplicated each and every character, activity, and art form, is to suppose the impossible.

Another consideration is interesting in this connection. Should we feel compelled to concede the existence of a race of advanced stone-age culture, such as that suggested by the group of artifacts presented, it would necessitate the further concession that the origin of the race was to be looked for in a still earlier period, for the best experience of anthropologists goes to show that early steps in culture are hesitating and slow, that the various steps which, in the normal order of culture progress, precede the era of polished stone, must have been of very great length; and should we adopt the conclusion of Whitney that no considerable advance in culture took place in California between Tertiary times and the present, and take this as a reasonable index of the rate of progress, we should have to look for the cradle of the race somewhere in the remote ages of the Mesozoic.

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[1] *Auriferous Gravels*, p. 279.

It may further be noted that the biologist, accustomed to regard animate nature from the point of view of the theory of evolution, will find it difficult to accept conclusions that would place the perfected man, the highest type of the highest order of animal life, the mammalia, too near the beginning of a series that ought in the natural order of things to show definite indications of progressive change.

EXAMINATION OF THE IMPLEMENTS PRESERVED

Turning now to the objects of art described by Whitney and others and preserved in the museum of the University of California and elsewhere (plate VI), we inquire more fully into their character and appearance. Whitney has said that the gravels were deposited by streams having violent currents, that the bones of animals were torn asunder and scattered, and that all objects were necessarily more or less worn; but it is observed that not one of the art objects attributed to the gravels shows the least sign of rough usage or wear; the marks they display of the tools used in flaking, pecking, grinding, and polishing are as fresh as in the implements and utensils found on modern Indian sites. This fact is so significant that it cannot be passed over without consideration.

Glancing again at the numerous implements, utensils, and ornaments attributed to the Auriferous gravels, we may inquire, What materials are represented? There are several varieties of stone, including granite, andesite, rhyolite, slate, obsidian, etc.

Andesite, however, prevails, and at least three-fourths of the objects are of this material. As most of these rocks in their original distribution are confined to somewhat limited portions of the geological column, some early and others late, it is proposed to inquire whether any of the specimens are of materials later in origin than the strata in which they are said to have been found. Full data are not yet at hand for a satisfactory analysis of this point; but it may be mentioned that andesite specimens are reported from horizons extending all the way from the earliest to the most recent gravels, yet so far as our geologists have gone this rock is not found in the formations of the particular region until toward the close of the Neocene. The objects being generally large, it is not to be supposed for a moment that they could have been brought from a distance. Again, obsidian is, generally speaking, a late product, having its origin in the most recent flows of the sierra, yet we have obsidian implements reported from the gravels of various districts, and in one case, at least, from deposits that must belong very near the initial stages of eruptive activity. This interesting line of research remains to be followed up until definite results are reached; this, however, cannot be done until the geology of the region is more exhaustively studied.

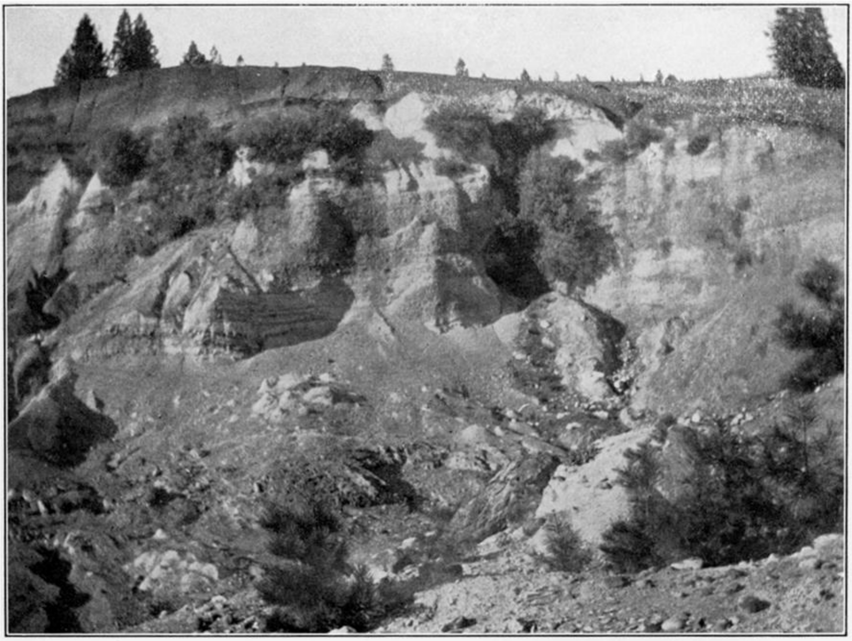
OBVIOUS SOURCES OF ERROR

It was not expected that a short visit to the Auriferous gravel region would lead to a final settlement of the whole question of Auriferous gravel man, for the task is a most difficult one. The recorded observations on which the structure of a Tertiary man is built cannot be made over again or satisfactorily tested, and new observations of a crucial nature must necessarily be of very rare occurrence. However, a reasonably intimate knowledge of the region and its phenomena was gained, and a foundation was laid for future research and for intelligent judgment as to the value of the extensive body of testimony already on record.

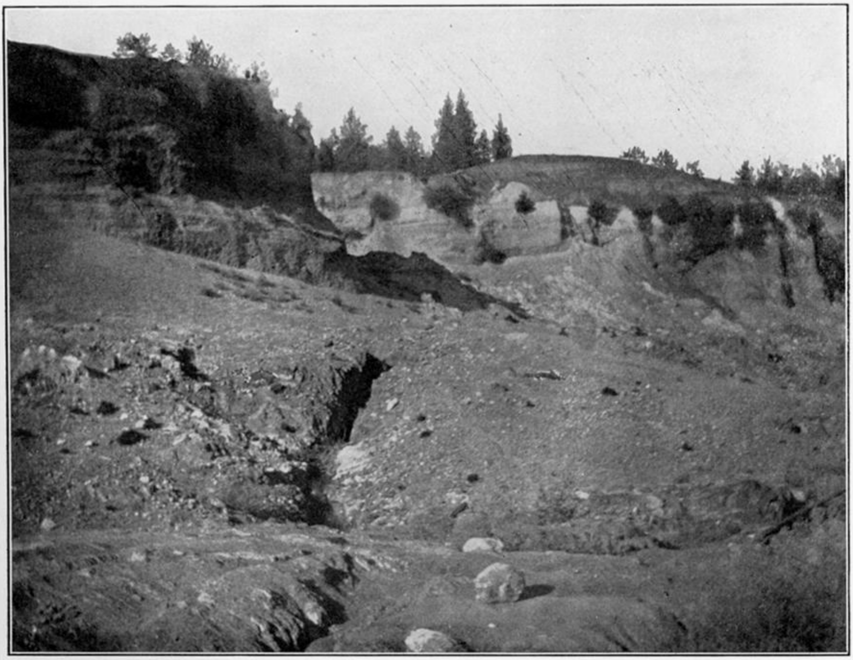
On reaching the mining region attention was turned first toward the nature, age, and relations of the gravel deposits, to the topographic character of the district, and to the profound changes brought about by the mining operations. Thanks to the thorough work done by our geologists, all of these matters were readily mastered, and nothing need be added to what has been said respecting them in preceding paragraphs.

In the second place, a study of the implements and utensils, ancient and modern, of the general region was made in order that comparisons might be instituted between them and the gravel finds. The results of this comparison have already been referred to, but further mention of the topic will later be made.

A third line of investigation related to the distribution of the aboriginal tribes and their relation to the mining areas and mines, and in this direction very significant observations were made. Indian village sites are scattered over the hills and tablelands, and ancient Indian sites were found everywhere. At Nevada City, Nevada county, a "Digger" Indian village was encountered on the margin of the tableland overlooking the great gravel mines a mile west of the city. Its people were engaged in gathering acorns and grinding them in mortars of various shapes; some of the mortars were worn in outcropping masses of granite, or in large, loose bowlders, while others consisted of flattish or globular masses of stone more or less modified in shape by artificial means; and it was realized that, as the hydraulic work progressed in the mine below, this site would be undermined and that one by one the utensils would drop in and become intermingled with the crumbling gravels, possibly to be recovered later with every appearance of having been imbedded with these deposits when they were laid down unnumbered centuries before. One of the mortars reported by Whitney was obtained from a mine on the western slope of this same hill, and it is easy to see how it could have rolled in from an Indian camp-site above, either before or during the prosecution of mining operations. The conditions observed



1—Weathered gravel wall 200 feet in height, with ancient village site above



2—Margin of mine with ancient village site in the distance

VIEWS IN DARDANELLES MINE SHOWING POSITION OF ANCIENT VILLAGE SITE here were repeated at nearly every mine visited in Nevada, Placer, Eldorado, and Calaveras counties. At Forest Hill, Placer county, the Dardanelles mine, extensively worked in the early days by Richard Clark and others, has undermined and obliterated a half or more of a terraced spur or "flat," as such features are called in that country, formerly occupied by an Indian village. (See plate VII.) According to Mr Clark, who still resides in Forest Hill, this site has not been occupied by the natives since work began in the mine in 1852; but an hour's search brought to light a dozen mortars and grinding stones, twenty or thirty rubbing stones and pestles, together with several varieties of smaller tools. As the ground of the site sloped toward the mine, most of the larger, and especially the rounder objects, must long since have rolled into the great pit (figure 2), the gravel walls of which are, on the one side, upward of two hundred feet in height. Many of the objects obtained were already in the gullies leading into the mine, and each year numbers must have gone over to become intermingled with the gravels, where they would remain for good unless

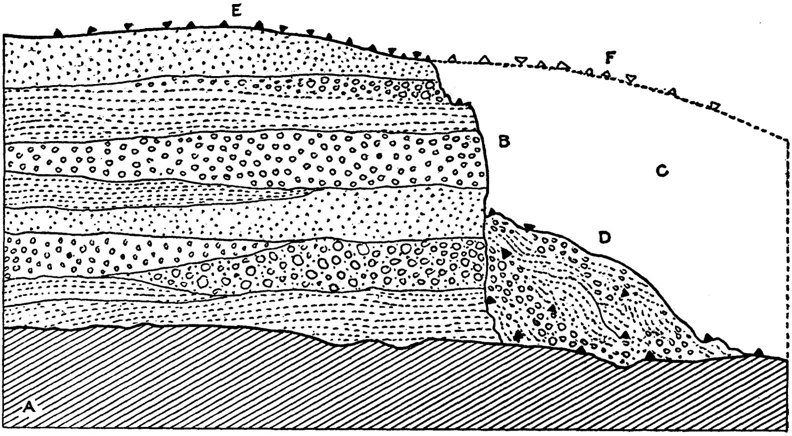


Fig. 2.—Section Showing Relations of Ancient Village Site to Gravel Mine.

A, Auriferous slates—bed-rock; *B*, Auriferous gravels, 250 feet thick; *C*, Great excavation made in gravels by hydraulic mining; *D*, Crumbled gravels, result of caving in; *E*, Ancient village site; *F*, Portion of village site destroyed by mine. The dark triangular figures in the talus show the distribution of artifacts resulting from mining operations.

some observant miner happened to bring them to light. Specimens thus found, falling into the hands of such collectors as C. D. Voy, would naturally be added to the growing list of Tertiary gravel relics. The flat dish or platter found by Voy in this or a neighboring mine[1] is identical in type with several of the specimens from the village site on the brink of the mine. A rough, roundish mortar and a small handstone were found by Professor McGee on a ledge thirty feet below the brink of this mine where they had fallen from above; and at Todd's valley, a few miles farther southward, a roundish bowlder some three feet in diameter, having a neatly shaped mortar in one side of it, was found resting on the bed-rock of a deep mine. This specimen had undoubtedly fallen in from above. An Indian dwelling was situated on the rim of the mine near by, and about it were scattered mortars of all kinds. A brush shelter in which the women grind acorns, a little higher up than the dwelling, contained at least a dozen pestles, both flattish and cylindrical in shape.

These significant relationships of Indian village sites and gravel diggings were repeated everywhere, and although Whitney observed the presence of the "Diggers," he made the mistake of supposing they used only fixed mortars, that is, those worked in the surface of large masses or outcrops of rock. The fact is that portable mortars and grinding stones of diversified forms are and have been used by Indians in all parts of California. It is not to be supposed that miners would pay much attention to the origin of relics found by them in the mines, since they attached no particular significance to them; so that between the unwary geologist, the unthinking miner, and the professional collector cultivating a prolific field, it is to be expected that a good many mistakes would be made.

No one can venture to say just what percentage of the finds reported by Whitney and accepted by him as evidence of antiquity are of the class here described, but certainly a large proportion may be assumed; and the observations made above cast a shadow of doubt over all specimens corresponding to known Indian forms reported from open mines, from such shafts and tunnels as do not extend beneath undisturbed formations, or from positions where any kind of post-Tertiary disturbance could have taken place.

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[1] *Auriferous Gravels*, p. 277.

In a second paper I hope to review the evidence further, and especially to present some data relating to the Calaveras skull.